This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-20 (Cancelled)

21. (Previously Presented) A process for coproduction of high purity paraxylene and styrene, starting from a feedstock containing xylenes, ethylbenzene and C9-C10 hydrocarbons, the process comprising the following successive steps:

a feedstock (l) distillation step so as to separate xylenes, performed in a distillation column (2), from which is withdrawn, at the head, a stream (3) comprising most of the metaxylene, paraxylene, ethylbenzene and at least part of the orthoxylene, and from which is withdrawn, at the bottom, a stream (4) containing C9-C10 hydrocarbons, the remaining part is orthoxylene;

a step of subjecting head stream (3) to adsorption in at least a first adsorption column (6) operating as a simulated moving bed and containing numerous adsorbent beds, optionally interconnected in a closed loop, and having a different selectivity for paraxylene, ethylbenzene, metaxylene, and orthoxylene, said column comprising at least four operating zones: a first zone for desorption of paraxylene located between the injection point of a desorbent (5) and the removal point of an extract (7a), a second zone for desorption of ethylbenzene, orthoxylene and metaxylene located between the removal point of extract (7a) and the injection point of adsorption feedstock (3), a third zone for adsorption of paraxylene, located between the injection point of adsorption feedstock (3) and withdrawal of a raffinate product (7b) and a fourth zone, located between the withdrawal point of raffinate product (7b) and the injection point of desorbent (5);

a step of distillation of extract (7a), performed in at least one distillation column (8a),

from which is withdrawn substantially pure paraxylene (9a), on the one hand, and on the other hand desorbent, which is then recycled, at least in part, in the first adsorption column;

a step of distillation of raffinate product (7b) in at least one distillation column (8b) from which is withdrawn, on the one hand, desorbent that is recycled at least in part in the first adsorption column and, on the other hand, a distilled raffinate product (9b) containing metaxylene, orthoxylene, and a minor amount of ethylbenzene compared to the xylenes;

a step of dehydrogenation of the distilled raffinate product containing metaxylene, orthoxylene and ethylbenzene to obtain an effluent containing styrene, metaxylene, orthoxylene, unconverted ethylbenzene and by-products, performed in at least one dehydrogenation zone (10), during which at least 50% by weight of the ethylbenzene introduced is converted into styrene;

at least one step of eliminating by-products from said effluent in at least one distillation column, to produce a mixture (18) containing mostly styrene, ethylbenzene, metaxylene, and orthoxylene;

a step of separating mixture (18), in which a first stream (23a) containing styrene with a purity of at least 99.8% by weight is produced and a second stream (23b) containing mostly metaxylene and orthoxylene is produced; and

an isomerization step, in a unit (24), of second stream (23b), optionally in liquid phase, in at least one isomerization zone, at the end of which a stream (25) containing paraxylene, orthoxylene, and metaxylene are recovered and are recycled upstream to feedstock distillation column (2).

22. (Previously Presented) Process according to claim 21, wherein the step of separating mixture (18) is performed in at least a second adsorption column (20) operating as a simulated moving bed, containing numerous beds of an adsorbent, preferably interconnected in a closed loop and having different selectivity for styrene, ethylbenzene, metaxylene, and orthoxylene, said column (20) comprising at least four chromatographic zones: a first zone, for desorption of

styrene, located between the injection point of a desorbent (19) and that of the removal of an extract (21a); a second zone, for desorption of ethylbenzene, metaxylene, and orthoxylene, located between the point where extract (21a) is removed and where an adsorption feedstock comprising said mixture (18) is injected; a third zone, for adsorption of styrene, located between the injection point of feedstock (18) and that of the withdrawal of a refined product (21b), and a fourth zone located between the point of withdrawal of raffinate product (21b) and that of injection of desorbent (19).

23. (Previously Presented) A process according to claim 21, wherein the extract is distilled to eliminate desorbent from it, the raffinate product is distilled to eliminate desorbent from it, and the recovered desorbent is recycled at least in part to the second adsorption column.

24. (Previously Presented) A process according to claim 21, wherein first adsorption column (6) is operated in five operating zones, a first raffinate product (7b), enriched with ethylbenzene, is withdrawn from this column and a second raffinate product (7c) is withdrawn between the withdrawal point of first raffinate product (7b) and the injection point of desorbent (5), said adsorption column (6) being then characterized in that it comprises: said operating zones 1 and 2 of first adsorption column (6), a zone 3A for adsorption of paraxylene, located between the feedstock injection point and the withdrawal point of the first raffinate product, a zone 3B for adsorption of ethylbenzene, located between the withdrawal point of the first raffinate product and the withdrawal point of the second raffinate product, a zone 4 located between the withdrawal point of the second raffinate product and the desorbent injection point.

25. (Previously presented) A process according to claim 24, wherein first raffinate product (7b) is distilled in a distillation column (8b) to eliminate from it substantially all the desorbent, first distilled raffinate product (9b) being then conveyed to dehydrogenation zone (10), and second raffinate product (7c) being then distilled in a distillation column (8c) to eliminate from it substantially all the desorbent, second distilled raffinate product (9c), which is recovered substantially free of ethylbenzene, being then directed toward the isomerization zone.

26. (Previously Presented) A process according to claim 21, wherein the adsorbent used in the first adsorption column is an X zeolite exchanged at barium, or a Y zeolite exchanged at potassium, or a Y zeolite exchanged at barium and potassium.

27. (Previously Presented) A process according to claim 22 in which the adsorbent used in the second adsorption column is an X or Y zeolite exchanged at sodium or barium or potassium or lithium as well as at potassium and silver.

28. (Previously Presented) A process according to claim 21, wherein the desorbent of the first adsorption column is selected from the group formed by paradiethylbenzene, toluene, paradifluorobenzene and diethylbenzenes in mixture.

29. (Previously Presented) A process according to claim 22, wherein the desorbent of the second adsorption column is selected from the group formed by toluene, naphthalene, and its alkylated derivatives.

30. (Previously Presented) A process according to claim 22, wherein the volumetric ratio of desorbent to feedstock for the first adsorption column is between 0.5 and 2.5, and the

volumetric ratio of desorbent to feedstock for the second adsorption column by adsorption is between 0.5 and 3.0.

31. (Previously Presented) A process according to claim 21, wherein the first adsorption step is performed at a temperature between 20°C and 250°C, and under a pressure between the boiling pressure of xylenes at the operating temperature and 2 MPa.

32. (Previously Presented) A process according to claim 22, wherein the second adsorption column is operated at a temperature between 20°C and 200°C and under a pressure between the boiling pressure of the mixture at the operating temperature and 2 MPa.

33. (Previously Presented) A process according to claim 24, wherein the first adsorption column contains at least 24 beds, at least 3 of which are in zone 3B.

34. (Previously Presented) A process according to claim 22, wherein the second adsorption column contains at least 16 beds, at least 5 of which are in the second zone.

35. (Previously Presented) A process according to claim 21, wherein fraction (9a) is enriched with paraxylene, to at least 50% by weight of purity, and is conveyed to at least one crystallization zone to deliver paraxylene crystals and a mother liquor, the crystals are separated from the mother liquor, optionally resuspended, washed, and recovered, and the mother liquor is recycled in the first separation column.

36. (Previously Presented) A process according to claim 21, wherein distillation column (2) is operated so that at least part of a fraction containing orthoxylene is withdrawn at the bottom of the column, said fraction further containing aromatics with at least 9 carbon atoms is conveyed

conveyed to a distillation column so that an orthoxylene stream with a purity of at least 98.5% by weight is withdrawn at the head and a stream containing aromatics with at least 9 carbon atoms and possibly orthoxylene is withdrawn at the bottom.

37. (Previously Presented) A process according to claim 21, wherein the separation step of mixture (18) is conducted by a separation technique selected from the group formed by distillation, azeotropic distillation, extractive distillation, liquid-liquid extraction, chemical complex formation, membrane separation, and their combination.

38. (Previously Presented) A process according to claim 21, wherein second stream (23b) further contains styrene, this stream is hydrogenated in a hydrogenation zone, and a hydrogenation effluent is recovered and conveyed to the isomerization zone.

39. (Previously Presented) A process according to claim 21, wherein second stream (23b) contains at most 10% by weight of ethylbenzene and the isomerization (24) is conducted in the liquid phase.

40. (Previously Presented) A process according to claim 39, wherein said second stream 23(b) contains at most 5% by weight of ethylbenzene.

41. (Previously Presented) A process according to claim 39, wherein the isomerised stream (25) represents 60-80% by weight of the total flow to the distillation column 2.

42. (Previously Presented) A process according to claim 21, wherein said minor amount of ethylbenzene is about 7% by weight.

43. (Currently Amended) A process for coproduction of high purity paraxylene and styrene, starting from a feedstock containing xylenes, ethylbenzene and C9-C10 hydrocarbons, the process comprising the following successive steps:

a feedstock (l) distillation step so as to separate xylenes, performed in a distillation column (2), from which is withdrawn, at the head, a stream (3) comprising most of the metaxylene, paraxylene, ethylbenzene and at least part of the orthoxylene, and from which is withdrawn, at the bottom, a stream (4) containing C9-C10 hydrocarbons, the remaining part is orthoxylene;

a step of subjecting head stream (3) to adsorption in at least a first adsorption column (6) operating as a simulated moving bed at a temperature between 20°C and 250°C, and under a pressure between the boiling pressure of xylenes at the operating temperature and 2 MPa and containing ~~numerous~~ at least 24 adsorbent beds, optionally interconnected in a closed loop, and having a different selectivity for paraxylene, ethylbenzene, metaxylene, and orthoxylene, said column comprising at least four operating zones: a first zone for desorption of paraxylene located between the injection point of a desorbent (5) and the removal point of an extract (7a), a second zone for desorption of ethylbenzene, orthoxylene and metaxylene located between the removal point of extract (7a) and the injection point of adsorption feedstock (3), a third zone for adsorption of paraxylene, located between the injection point of adsorption feedstock (3) and withdrawal of a raffinate product (7b) and a fourth zone, located between the withdrawal point of raffinate product (7b) and the injection point of desorbent (5);

a step of distillation of extract (7a), performed in at least one distillation column (8a), from which is withdrawn substantially pure paraxylene (9a), on the one hand, and on the other hand desorbent, which is then recycled, at least in part, in the first adsorption column;

a step of distillation of raffinate product (7b) in at least one distillation column (8b) from which is withdrawn, on the one hand, desorbent that is recycled at least in part in the first adsorption column and, on the other hand, a distilled raffinate product (9b) containing

metaxylene, orthoxylene, and a minor amount of ethylbenzene compared to the xylenes;:

a step of dehydrogenation of the distilled raffinate product containing metaxylene, orthoxylene and ethylbenzene to obtain an effluent containing styrene, metaxylene, orthoxylene, unconverted ethylbenzene and by-products, performed in at least one dehydrogenation zone (10), during which at least 50% by weight of the ethylbenzene introduced is converted into styrene;

a least one step of eliminating by-products from said effluent in at least one distillation column, to produce a mixture (18) containing mostly styrene, ethylbenzene, metaxylene, and orthoxylene;

a step of separating mixture (18) in at least a second adsorption column (20) operating as a simulated moving bed at a temperature between 20°C and 200°C and under a pressure between the boiling pressure of the mixture at the operating temperature and 2 MPa and containing at least 16 beds, in which a first stream (23a) containing styrene with a purity of at least 99.8% by weight is produced and a second stream (23b) containing mostly metaxylene and orthoxylene is produced; and

an isomerization step, in a unit (24), of second stream (23b), optionally in liquid phase, in at least one isomerization zone, at the end of which a stream (25) containing paraxylene, orthoxylene, and metaxylene are recovered and are recycled upstream to feedstock distillation column (2).

44. (Previously Presented) A process as in claim 43 wherein said step of dehydrogenation of the distillation raffinate product is performed in at least one dehydrogenation zone (10) without the addition of steam.

45. (Previously Presented) A process as in claim 43 wherein said step of dehydrogenation of the distillation raffinate product is performed in at least one dehydrogenation zone (10) with a catalyst free of iron oxide.

46. (Previously Presented) A process as in claim 43 wherein said step of dehydrogenation of the distillation raffinate product is performed in at least one dehydrogenation zone (10) with a catalyst free of chlorine.

47. (Previously Presented) A process as in claim 45 wherein the catalyst used in at least one dehydrogenation zone (10) comprises tin and chromium.